Small Business Innovation Research/Small Business Tech Transfer

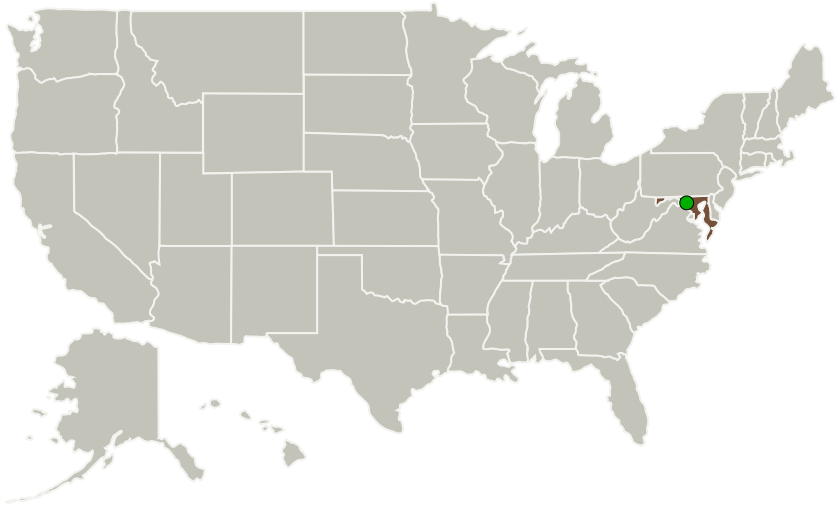
Formaldehyde Profiler Using Laser Induced Fluorescence Technique, Phase II

Completed Technology Project (2012 - 2015)

Project Introduction

Formaldehyde (HCHO) is a key trace species that is of great interest to atmospheric scientists in NASA and other research institutions. In this SBIR project, we proposed to build an airborne atmospheric formaldehyde (HCHO) profiler implementing a Laser Induced Fluorescence (LIF) technique. This airborne instrument can also be used on the ground for measuring vertical HCHO profiles. To our knowledge, there exists no previous formaldehyde remote sensor that can measure range resolved formaldehyde profile by any technique. The instrument will be able to provide an HCHO profile from an aircraft flying at 20 km altitude to the ground at a 1 km range resolution, and achieve sensitivities better than 70 part-per-trillion-by-volume (pptv) concentration levels at a range of 1 km at nighttime with one second averaging time. In addition, we will explore the feasibility of daytime operation achieving sensitivity of less than 1 part-per-billion-by-volume (ppbv) at a range of 3 km. In Phase I we have built a breadboard formaldehyde profiler instrument and demonstrated the capability of performing highly sensitive nighttime formaldehyde measurements. The outcome of the Phase I work established the feasibility for high sensitivity detection of range resolved HCHO, and provides the design of the prototype sensor.

Primary U.S. Work Locations and Key Partners



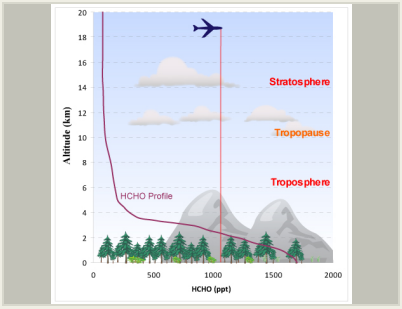


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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Masstech, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB), Minority-Owned Business	Columbia, Maryland
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Project Transitions

April 2012: Project Start

April 2015: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Masstech, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

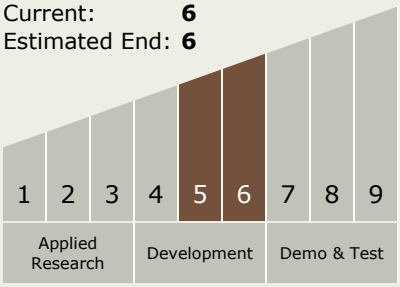
Carlos Torrez

Principal Investigator:

Anand Radhakrishnan

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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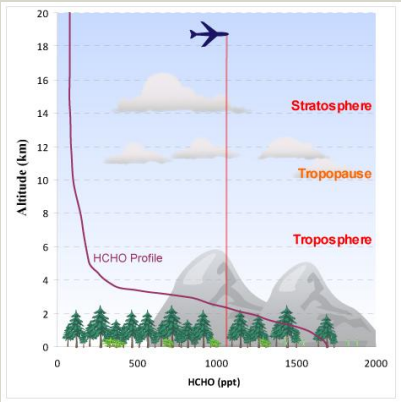
Images



Project Image
Formaldehyde Profiler Using Laser Induced Fluorescence Technique
(https://techport.nasa.gov/image/129733)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars